

*A private company founded on NASA data processing technology leads a selection of technology transfers in agriculture and natural resources management*

Remote sensing is the process of acquiring physical information from a distance, for example, obtaining data on Earth features from a satellite or an airplane. The best known and most widely used remote sensing systems are the NASA-developed Landsat resources survey satellites, which offer a means of monitoring changing Earth conditions through spaceborne sensors that detect various types of radiation emitted or reflected from objects on Earth's surface. This information can be put to practical use in such applications as agricultural crop forecasting, land use management, mineral and petroleum exploration, mapping, rangeland and forest management, water quality evaluation, disaster assessment and scores of others.

Raw data from Landsat or other remote sensing systems is computer-processed at ground facilities and translated into tapes or images. The data can then be interpreted to tell the difference, for example, between one type of vegetation and another, between densely populated urban areas and lightly populated farmland, or between clear and polluted water. The basic imagery can also be computer-enhanced to correct sensor errors, to make the image compatible with standard maps, or to emphasize certain features. This technology has given rise to a small but growing industry that supports users of remotely sensed data by providing computer-processing, data analysis and interpretation services.

One such company is Delta Data Systems, Inc. (DDS), Picayune, Mississippi, which might be considered a "double-barreled spinoff." It is, on the

one hand, an example of the personnel type of technology transfer, in which aerospace scientists and engineers move to other industries or form new companies, transferring their aerospace-acquired skills and know-how to new applications. In addition, a major DDS development—the ATLAS software system—is an adaptation of a NASA-developed computer program.

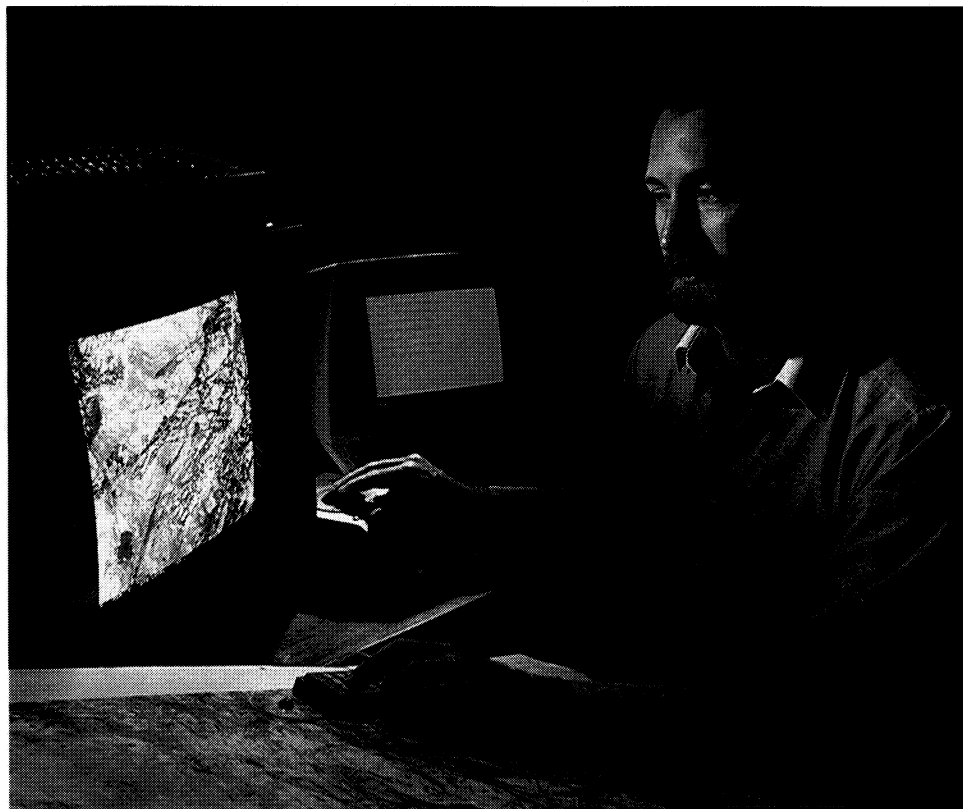
DDS was formed by a group of former NASA/industry engineers with extensive experience at NASA centers in designing hardware and software for digital image processing systems. Says DDS president Ferron Risinger: "This company is an outgrowth of our previous work for NASA; its purpose is to carry on beyond NASA's role in transferring remote sensing technology." Risinger was formerly a systems engineer with Lockheed Electronics, later a computer systems analyst for the NASA Earth Resources Laboratory at the National Space Technology Laboratories.

In the latter connection, Risinger was project leader for installations—at Ames Research Center and other facilities—of the NASA-developed computer program for processing remotely sensed data called ELAS (Earth Resources Laboratory Applications Software). After founding DDS, he and his associates used ELAS as a "shell" for developing the company's ATLAS geographic information system, used to process satellite and aircraft data, to digitize soil and topographic maps and to generate land use maps. The ATLAS

system has been used by a number of DDS clients for producing land cover classification maps. Although ATLAS was developed for geographic use, DDS also plans some medical applications that involve processing of digital image data. An unusual application is computer-directed tuna processing; the computer assigns values to different parts of the fish (cat food, white meat, dark meat, etc.), then directs the movements of a robotic cutting waterjet to slice the tuna with maximum efficiency.

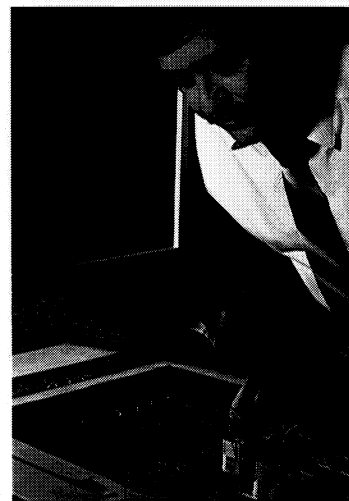
The company estimates that use of ELAS as a basis for ATLAS development saved an additional four man-years that would have been required to develop the 100 applications modules in the ATLAS system. ELAS was supplied to DDS by NASA's Computer Software Management and Information Center (COSMIC)<sup>®</sup>, an extension of NASA's Technology Utilization Program which provides NASA computer programs to other agencies of the government and to the private sector (see page 127).

Among DDS hardware designs are a microprocessor-based system for production control and energy management systems, turnkey remote sensing systems and high speed interfaces between several types of computers and associated equipment, such as image displays. DDS also provides a number of specialized services for the remote sensing community, including consultation, training personnel in use of the ATLAS system, in-house data pro-



cessing and on-site data processing support. The company's customers include private firms, educational institutions, state and federal agencies, among them the National Park Service, Vandenberg Air Force Base, the Florida Department of Transportation and several universities. ▲

*In the upper photo, a Delta Data Systems technician is computer-enhancing a Landsat image to include geographic coordinates. At right, company president Ferron Risinger is adjusting a wire wrap board, one of a number of hardware systems developed by Delta Data Systems for processing remotely sensed data.*



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